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A Comparison of Military Base Closures

Metro and Nonmetro Counties, 1961-90

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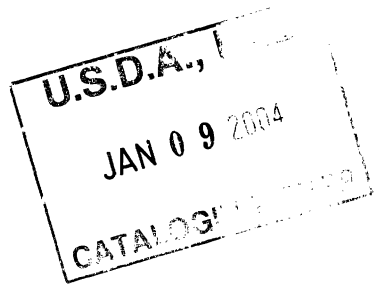

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Abstract

This report describes socioeconomic changes in local economies following closure of a military base. Comparisons are drawn between effects in nonmetro and metro counties, and between counties experiencing a base-closing and all other counties. Despite extreme variation in economic growth among base-closing counties, three intriguing conclusions are found: 1) job losses tended to constitute a higher percentage of total employment in nonmetro counties than in metro counties; 2) of the 83 base-closing counties studied, one-third did not regain as many civilian jobs as were lost; 3) growth rates for employment, income, and population were slower in the average nonmetro base-closing county than in both the average metro base-closing county and the average nonmetro county nationwide.

Keywords: Military bases, metro, nonmetro, counties, base closures.

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Introduction

Military facility shutdowns in all communities—both rural and urban—generally create fear and resistance among local residents and their elected officials. As with the loss of any major employer, job and income losses and the resulting damage to the local economy become the central focus. In addition, onbase health care services for military personnel who choose to resign and remain in the area as well as for local military retirees are lost. Finally, severe reductions in local school enrollments can occur. The economic damage may be worse in rural communities with their typically smaller, and less-diversified economies.

On the other hand, closed military facilities with land, buildings, and physical equipment are often provided to communities at little or no cost. These assets can prove valuable in redeveloping the base after the military leaves, especially in rural communities with few resources. The redevelopment may be more beneficial to the local economy than the base activities it replaces.

This report examines economic changes in selected counties where one or more military bases closed during the 1960's, 1970's, and early 1980's (fig. 1). Comparisons are made between metro and nonmetro counties where bases closed, and between these base-closing counties and their respective (metro and nonmetro) national means.[1]

Context

Since 1961, over 100 military bases have been converted to civilian use. An additional 121 bases are slated for closure according to the 1988 and 1991 reports of the Defense Secretary's Commission on Base Realignment and Closure.[2] Thus, the interest in analysis of prior closures is more than historical. The analysis should give local officials and policymakers valuable information with which to assess the likely effects of base closures and to plan for conversion. The analysis may also provide insight with which to assess the likely effects from the loss of other large employers, such as manufacturing plants. Although military base closures do bear some resemblance to manufacturing plant closures, there are some important differences that will become apparent in the following discussion.

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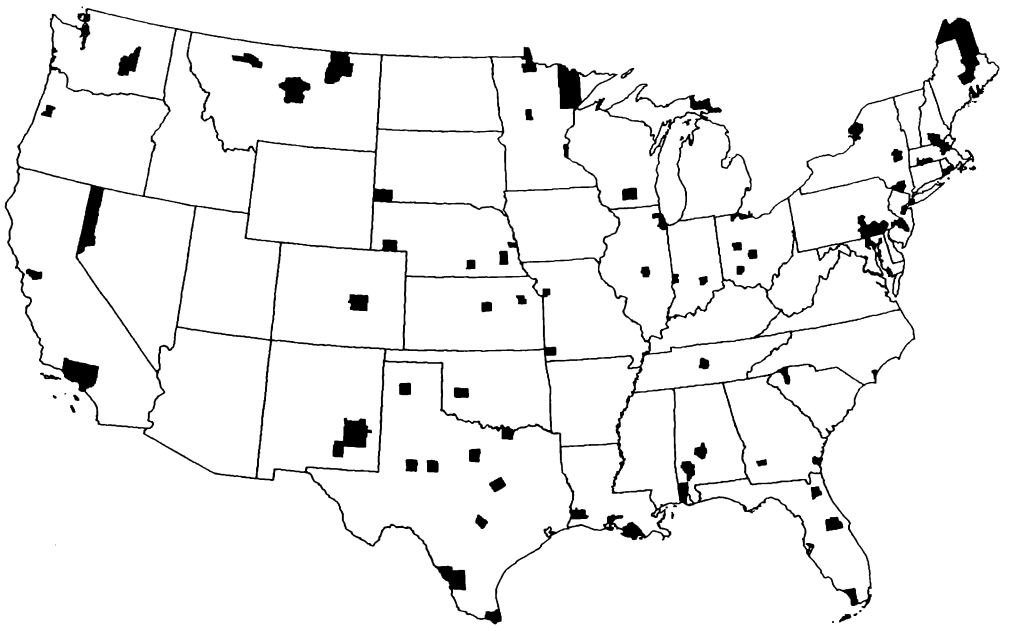
[1]Nonmetro counties are those counties that are not included in a Metropolitan Statistical Area, as defined by the Bureau of the Census, U.S. Department of Commerce, as of 1983. The terms "nonmetro" and "rural" are used interchangeably in this report, as are "metro" and "urban."

[2]Fewer than 50 of the 121 bases slated for closure are major bases.

Figure 1

Selected military base closings, 1960-82*



*Counties where one or more bases closed and Office of Economic Adjustment assistance was requested.

Determining the Effects of Base Closure

The effects of base closure on a community vary depending on several factors. The factors include level of dependence by the local economy on the base, the general economic climate at time of closure (that is, expansion or contraction of the national economy), the size of the base, the region of the country (which is essentially a proxy for fundamental factors, such as climate or culture), the preparedness of the local community for conversion, and other characteristics of the local community (such as, whether metro or nonmetro) all affect the outcome of base conversion.

Previous Base-Closing Studies

There have been two major types of base-closing studies. The most common type is designed to argue against the closing of a specific base. The second type is a post-closure study of the effects on affected communities. Most of the studies (of both types) were conducted in the 1970's—after the closures in the 1960's and during a period of increased local resistance to proposed closures in the 1970's. Although a base was closed in 1982, there were no major base closure announcements for approximately 10 years—until the 1988 announcement. (See appendix table 1 for the years in which bases closed.)

The first type of study—used to argue against closure—generally relies on input-output analysis to predict the effects of closure on employment, earnings, and trade (business volume or sales) in the community. Some studies also examine potential effects on property values, tax base, and population.

The second type of study more closely resembles the study at hand. The seminal work by Lynch (1970) covered what was learned during the first 8 years of the Office of Economic Adjustment's (OEA) existence. Lynch selected and examined 12 communities making the transition. They were

selected in order to portray a variety of circumstances. He assumed smaller communities have more difficulty in economic recovery, so the case studies were limited to communities of less than 1 million. (Hence, the cases were not representative of all base closures.) Though Lynch argues that there were few unsuccessful programs, he purposefully chose both successful and unsuccessful recovery programs. He argued that the successful recovery efforts did not just happen, but resulted from a "conscious and painstaking program to marshal local leadership and community initiative in each of the affected areas." The efforts were aimed explicitly at the assets and strengths of each community. A community's immediate concern was to find new job-producing activities in order to stem the tide of emigration.

Daicoff and others' (1970) case study of military base closings examined short-term effects on both communities and workers. The study concluded that individuals and communities affected by the 1960's closures adjusted without "calamitous economic or social consequences." The authors stated that the robust national economy of the 1960's may have been a significant mitigating factor.

The Daicoff study found that when direct reduction of employment due to base closure was at least 5 percent of the community's population, the closure reduced overall employment in the community. Bases with a smaller proportion of the local economy showed no consistent effect on the total employment of the community. Regardless of the relative size of the base there was little effect on the community's unemployment rate. The primary reasons for minimal change in the unemployment rate include: active military personnel were transferred rather than introduced into the local labor pool, significant effort was made to also transfer and relocate civilian personnel (keeping them out of the local labor market), and many local jobs were vacated by the transferred defense personnel and their dependents, thus freeing up positions for those who directly or indirectly lost their jobs due to the closure.

Gross job losses and unemployment also did not materialize in communities studied by MacKinnon (1978). His study reviewed the economic progress of seven communities located near Air Force bases that closed in the mid-1960's. These seven communities varied by population size and region of the country. MacKinnon found that, of the seven communities, three were experiencing persistent population decline and three were exhibiting solid population growth. Four of the studied communities showed greater increases in jobs than the national average. Only Roswell, NM, showed a net decrease in jobs.

MacKinnon found lower salary levels in the jobs created than were in the jobs lost with the communities' military and Department of Defense civilian jobs. Per capita income levels, however, were not drastically affected by the base closures. All seven communities showed increases in retail sales between 1964 and 1973, but Lincoln, NE, Amarillo, TX, and Roswell, NM, were below the national rate of retail sales growth. The retail sales figures were inconclusive.

Daicoff and others found that the smaller and more isolated a rural community, the more effort was required to secure replacement activities that would keep the unemployment rate at pre-closure levels and keep a degree of economic diversification. Public program expansion, such as education activities, often provided the first activities to offset base closure. A united effort by the community was necessary to obtain redevelopment with permanent private enterprises. A site with a large airstrip was more likely to lead to successful redevelopment; there were good freight and transportation facilities at these sites. Excess housing was a problem, especially in the low-cost end of the market: vacancy rates rose, mortgage defaults increased, and further deterioration of existing stocks occurred.

Both Lynch (1970) and MacKinnon concluded that the changes resulting from base closures in retail sales were minimal. MacKinnon found that sales continued to grow at or better than the national rate for most of the seven communities. Apparently, military personnel, many of whom are housed on the

base, had contributed little to the local economy. Base personnel and the base procurement office generally had made few local purchases.

A base closure, according to MacKinnon, often leads to:

- Community leadership becoming organized for future development,
- A community's economy becoming diversified,
- Professional economic development plans being provided through Federal program assistance,
- Prime acreage and facilities at the former base becoming available for redevelopment,
- Educational facilities being created to build a skilled labor force,
- New job opportunities being provided by new and expanding industry,
- Federal assistance focusing on affected communities,
- Many previously unmet social and economic needs of the community becoming satisfied by newly available facilities on the former bases (such as housing, health, recreation, education, and airport facilities) at no cost to the community, and,
- The community, through an imposed self-evaluation, emerging with greater confidence and renewed spirit about the future.

For smaller communities, the most demanding task has been the difficulty in overcoming the lack of basic local organizational understanding and self-confidence needed to move toward economic growth (Lynch). Smaller communities were more strongly affected by base closures than were large communities. This was particularly true in communities located in chronically declining regions.

MacKinnon concluded that smaller communities were more severely hurt and had more difficulty in stimulating recovery. The two smallest communities in his study were Bangor, ME, and Roswell, NM. They were relatively far removed from urban markets and major transportation access. Each, however, was able to capitalize on other unique assets to mitigate the effect of closure. Bangor was situated as a stopover point for international air traffic between the United States and Europe. Roswell used the housing on the closed facility for development of a growing retirement community.

Effects of Base Closure in Rural Areas

Rural areas face special problems when a military base closes. Because of their typically smaller size and less-diversified economies, rural areas are assumed to suffer more from base closure than urban areas. In fact, rural areas have shown a wide range of success in dealing with base closures—ranging from successful redevelopment of the closed facilities to no redevelopment at all.

An example often cited as a major success in redevelopment of a rural base is Dow Air Force Base in Bangor, ME. As mentioned earlier, the community took advantage of the closed airbase's location along a major international air route to develop a highly successful commercial airport.

Not all communities have been as successful. Glasgow, MT (Glasgow Air Force Base), used part of its former base to house a small religious college. The college later closed. Recently, a real-estate developer purchased the base's housing units and has begun selling them. Boeing has also begun using the airstrip for flight testing. The Black Hills Army Depot, near Edgemont, SD, is one site that has never been successfully redeveloped. The depot's closing had little effect on the well-being of the community because the base was small and the community did not depend upon it.

Federal Aid to Communities Facing Base Closures

The Office of Economic Adjustment (OEA) was established in the Department of Defense by Secretary Robert McNamara in the spring of 1961 and is part of the President's Economic Adjustment Program. The sole mission of OEA is to help offset adverse economic effects caused by changes in a Department of Defense program, such as base closure. OEA serves as the professional staff for the Economic Adjustment Program (EAP).

The EAP is a community-based approach with four major components carried out in conjunction with other cooperating Federal agencies (President's Economic Adjustment Committee and OEA, 1985).

1) The Job-Guarantee Program ensures each career civil servant with reassignment to another Federal position or a new employment offer.

2) The Property Disposal Program speeds the release of buildings and equipment on the former bases to the host communities, through sale or gift. This allows communities to reuse the facilities in accordance with an economic recovery plan and keep facilities from remaining unoccupied for unnecessarily long periods of time.

3) The EAP identifies local dependents (the local contractor and subcontractor network for the base) and recognizes some of the economic effects off the base.

4) Worker adjustment, the retraining of former civilian base employees, is a mechanism to help former workers in their quest for new jobs.

The OEA assists communities only when asked by the community (Lynch (1970), MacKinnon). It does not impose its interest or influence upon any community but, rather, serves in an advisory role. The local community must make the hard decisions about developing and implementing a plan for redevelopment of the base. Lynch states that, in general, communities which have been the most reserved in their attitudes toward assistance from the OEA appear to be the most disturbed when OEA does not immediately prescribe a ready-made solution for the community to adopt.

Communities are encouraged to find long-term solutions for their economic needs (Lynch, 1970). "Band-aid" approaches distract the community's attention from redevelopment of the base and are discouraged. For instance, OEA discourages the temporary use by businesses of the facilities on the base, as this would interfere with planning for long-term use (Lynch, 1970).[3]

Surplus military installations can also be used to advance community educational, health, and recreational programs, leaving other funds available to be used for people rather than buildings and equipment. Realizing the potential for such reuse, OEA established special procedures to prevent unnecessary dismantling during closure. Personal property (such as desks, chairs, and kitchen

[3]When the military has not finished operations on the base and some property is not being used, the property may be used on an interim basis.

equipment) useful for community redevelopment of the base is held in place to the extent possible without denying valid military needs. In addition to helping meet a community's social needs, these resources indirectly contribute to a community's economic development prospects.

Other Federal agencies are part of the EAP. While the Department of Defense assumes most of the financial responsibility, the Economic Development Administration (U.S. Department of Commerce) assumes most of the administrative responsibility. The General Services Administration determines the price the Federal Government charges for its surplus property. The Federal Aviation Administration has assisted communities in establishing municipal airports. The U.S. Departments of Agriculture, Interior, and Labor and other agencies have provided technical advice. The U.S. Department of Education (and its predecessor, the Department of Health, Education, and Welfare) has been instrumental in establishing and developing educational facilities on former bases. Overall, Federal Government agencies provided from $80-$90 million a year in assistance to communities affected by base closures from 1973 to 1980 (Bacon).

Data

Military employment and transfer data used in our analysis are from *Civilian Reuse of Former Military Bases, 1961-1990*, the President's Economic Adjustment Committee, which was originally published in 1978 and revised and republished in 1990. The data are found in Appendix B, "Summary of Completed Military Base Economic Adjustment Projects 1961-1990." The data are from an updated survey of job generation and base reuse for communities in 83 counties (50 metro and 33 nonmetro) conducted in 1990. The summary identifies the number of military and civilian job losses on base, the number of civilian replacement jobs on the former base facilities, and the principal reuse activities of the base, along with the names of community contacts who can provide more information. The survey includes only those communities that experienced base closures after 1961 and requested assistance from the OEA.[4]

County employment and income data are from the Bureau of Economic Analysis, U.S. Department of Commerce. Base data for this analysis have been converted to county observations that begin the year of base closure and end the year the base was acquired by a new developer.[5] In counties where more than one facility closed, data for the various bases were summed, and the relevant time frame became the period between the year of closure for the first base to close in that county and the year of acquisition for the last base to be acquired.

Analysis

The remainder of this report examines these data and compares the effects of closures in both metro and nonmetro counties.

Acquisition of Base Facilities

The amount of time it takes a community to acquire base facilities after closure affects economic recovery (Lynch (1987), Daicoff). On average, nonmetro counties acquired facilities slightly faster than did metro counties (2.2 years versus 2.5 years). Acquisitions took as long as 13 years for two nonmetro counties and 9 years for two metro counties. The average amount of time for acquisition

[4]The OEA assists only those communities that request assistance. Therefore, OEA collects conversion data only on those communities. However, nearly all major base closings meet this criterion and are, therefore, included.

[5]We assume that most of the effects caused by the closure are confined to the county.

may be misleadingly fast because acquisition time was measured only when the base was finally closed. In some cases, the base was partially closed far in advance of final closure.

While the data are not capable of explaining the differences in acquisition times, some factors that affect the length of acquisition time can be identified. Prolonged battles to keep a base from closing often delay preparations for conversion of the base when and if it ultimately closes. Land use regulations—zoning designations, subdivision requirements—can also impede conversion, and consequently slow redevelopment. Finally, the larger size and often more complex organization of metro governments, coupled with a greater sense of urgency on the part of nonmetro counties to replace bases and, thus, bolster their smaller, more specialized economies, may have given a slight edge to nonmetro counties.

The time it takes for a base to be acquired by local interests (private or public) after closure should be a factor in recovery, at least in the short run. Until the facilities are acquired and put to use, they are adding nothing to the local economy. A test for correlation bears this hypothesis out. There is a negative correlation between acquisition time (year of acquisition - year of closure) and net change in employment, although the relationship is not statistically significant.

Employment Losses

In this analysis, we examine two types of employment losses—civilians employed on base whose jobs were eliminated and military personnel who were transferred to other facilities. The two are treated separately because the multiplier effect of each in the local economy differs. Military personnel typically have a lower multiplier effect within the local economy because they purchase or obtain many goods and services (including housing) on base, rather than from local providers.

Our analysis does not attempt to quantify the indirect effects of base closure on local employment. Our data are incapable of presenting an accurate view of this relationship. Only through the use of an input-output analysis of the individual counties, or through use of some other data-intensive analytic technique, would we be able to measure the indirect effects.

Table 1 presents data on employment losses and additions for metro and nonmetro counties. The average number of civilian jobs lost on base was much higher in metro than in nonmetro counties. The 18 bases with the greatest losses were all in metro counties—pointing to the larger size of metro base facilities. Average job losses due to transfers tended to be even between metro and nonmetro categories, with nonmetro counties losing slightly more on average. To avoid masking important differences by using the population mean (the "fallacy of composition"), civilian onbase job losses were divided into fifths (app. fig. 1). Metro counties lost more civilian jobs on base across all percentiles, while nonmetro counties lost more transfers in most percentiles.[6]

Because of differences in the multiplier effect, the loss of civilian jobs on base is more damaging to a local economy than the loss of transfers. The higher proportion of transfers in the nonmetro counties may mean that some of the negative effects of closure were mitigated in nonmetro counties. The average nonmetro community was relatively less dependent, in terms of direct employment, on the closed base than the average metro base-closing community. Even though the multiplier effect may be mitigated, the multiplier effect can be, and likely will be, higher in nonmetro than in metro areas. Particular multiplier effects of job losses depend on the type of base facilities (for example, personnel housing and post exchange) and the base's proximity to the community.

[6]Percentiles were also run breaking the distribution into tenths to further check for distributional differences. The results of each concur. The same is true for percentiles presented in the rest of the paper.

Table 1—Employment effects of military base closures, 1969-88

Item	Base-closing counties	Civilian jobs lost on base	Military transfers	Civilian jobs added on former base	Jobs regained as a percentage of—	
					Civilian jobs lost*	Civilian jobs lost and military transfers**
	(1)	(2)	(3)	(4)	(5)	(6)
	Number				*Percent*	
All bases:						
Total	83	86,967	132,376	162,185	na	na
Average	na	1,048	1,595	1,954	187	74
Nonmetro:						
Total	33	12,368	55,855	36,970	na	na
Average	na	375	1,693	1,120	299	54
Metro:						
Total	50	74,599	76,521	125,215	na	na
Average	na	1,492	1,530	2,504	168	83

na = Not applicable.
*Column 4 divided by column 2.
**Column 4 divided by the sum of columns 2 and 3.

These absolute numbers of lost civilian onbase jobs and military transfers say little about the effect on the county's economy because they are not expressed relative to the size of that economy. We address this problem by standardizing job losses and transfers by dividing them by total county employment in the year of closure. The resulting numbers are the average percentage of total county employment lost through onbase civilian job cuts and military transfers (fig. 2).[7]

Nonmetro counties did significantly worse than metro counties, losing an average of 3.25 percent of total county employment to civilian onbase job cuts, while metro counties lost only 1.32 percent. Seven of the eight top civilian onbase job losers relative to total employment were nonmetro counties. In terms of military transfers, the average percentage of total county employment lost through transfers in nonmetro counties was more than double that of metro.

Combining the two types of losses (while remembering that the two types have different effects on the local economy due to differences in the multiplier effects), the average nonmetro base-closing county lost nearly 10 percent of its total county employment, compared with less than 4 percent for metro counties. At the extreme, the worst nonmetro and metro counties each lost roughly 34 percent of total county employment.

These data point to the obvious fact that nonmetro counties had smaller total county employment in the year of base closure than did metro counties. The smaller total employment figure meant that job losses (although absolutely smaller in nonmetro counties) constituted a larger percentage of total employment in nonmetro counties, and, thus, reflected a larger relative dependence of the local economy on the military base.

[7]These figures represent only those bases closed after 1969 because county employment data are unavailable prior to that year.

Figure 2

Job losses as a share of total county employment, post 1969

***County average**

Employment Gains

As was the case with job losses, more than twice as many new jobs were added on the former base facilities in metro counties than in nonmetro counties (see table 1). The 9 leading former bases in absolute number of jobs gained when the base was converted to nonmilitary use were in metro areas, as were 15 of the top 20.

The strongest test, in this analysis, of onbase recovery is the number of lost civilian jobs on base that were regained—net employment change. In terms of net employment change, nonmetro counties fared slightly better, recouping 299 percent of lost jobs on average, while metro counties recouped 168 percent (see table 1).

These averages are deceiving, however, because only two-thirds of all counties (70 percent of nonmetro and 68 percent of metro) regained as many or more civilian jobs as were lost on their former base. Thus, the remaining one-third suffered net reductions in onbase employment, with some suffering severe net reductions. Mobile (a metro county in Alabama) lost a net total of 7,745 civilian jobs on base. Dauphin County, PA (also metro), lost a net total of 7,250 jobs. The worst of the nonmetro counties—Monroe County, FL, and Fall River County, SD—each lost a net total of 508 jobs. In terms of percentage of employment regained, the worst metro county—Chester County, PA—regained

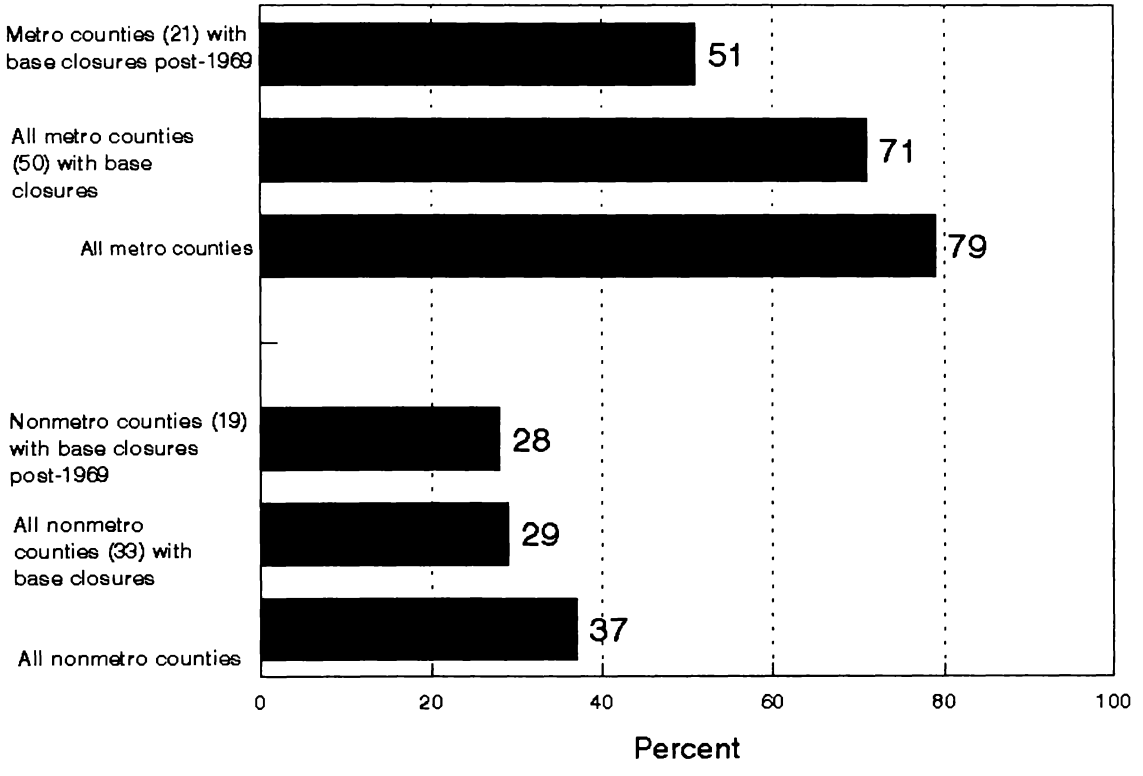
only 6 percent. The worst nonmetro counties—Fall River County, SD, and Valley County, MT—regained 1 percent and 8 percent, respectively.

Despite the fact that metro counties, on average, added more than twice as many jobs on the former base facilities, nonmetro counties lost only a quarter as many jobs. Thus, the net additions for metro and nonmetro counties are nearly the same. Because the bulk of losses in the nonmetro counties were in transfers, the net losses for jobs and transfers (jobs added on former base facilities)/(civilian jobs lost on base + military transfers) were worse in the nonmetro counties (see table 1).

Finally, we examined the change in total county employment from 1969 to 1988, comparing counties in which bases closed after 1969 against all counties nationwide (fig. 3).[8]

Average employment growth in all metro categories was more than double the nonmetro growth (fig. 3). The most telling point, however, is that the nonmetro base-closing counties grew at only 78

Figure 3
Change in total employment, county average, 1969-88



[8]The 1969-88 time period was chosen for additional analysis for two reasons. First, it represents a "peak-to-peak" period across the business cycle. Second, it takes advantage of our earliest available data. (Ideally, we would have used a "peak year" prior to any of the closures in the 1960's.) Because of our use of the 1969-88 time period, part of the post-closure recovery of counties in which bases closed prior to 1970 is not taken into account. The aim here is to measure the full effect of the military base closure. Therefore, for this analysis, one must have pre-closure and post-closure employment. Hence, no county was chosen where data at least 1 year prior to closing were not available. Obviously, this is not a perfect system since it is possible that employment drawdown occurred over a longer period than 1 year prior to closing. Nevertheless, it avoids using a mix of some counties that had already passed through the period of negative economic effect from the closure with those that included the downturn period.

percent of the all-nonmetro rate, while the metro base-closing counties grew at 90 percent of the all-metro rate. When one compares just counties with post-1969 closures, the nonmetro counties look relatively stronger than the metro counties (76 percent of nonmetro growth versus 65 percent of metro growth). But those nonmetro counties experienced slower growth than the full set of nonmetro counties with base closures (76 percent of the all-nonmetro growth rate versus 78 percent).

Income and Population

Figure 4 compares real per capita income growth across post-1969 closure counties, all base closure counties, and all metro and nonmetro counties. Nonmetro base-closing counties grew only 92 percent as fast as all nonmetro counties. Contrary to expectations, real per capita income change is of similar magnitude across all categories.

Per capita income growth, however, can be deceptive because of changes associated with population growth. As figure 5 shows, total real income in nonmetro base-closing counties grew at only 70 percent of the all-nonmetro rate. The metro base-closing counties grew substantially faster—at 88 percent of the all-metro rate.

The difference in the relationships shown in figures 4 and 5 is explained by population growth (fig. 6). Relatively strong total income growth in the metro county categories appears weaker in per capita measures because of strong metro population growth. The same is true, albeit to a lesser extent, for the all-nonmetro county average. Population in metro counties—with or without base closures—grew

Figure 4

Change in real per capita income, county average, 1969-88

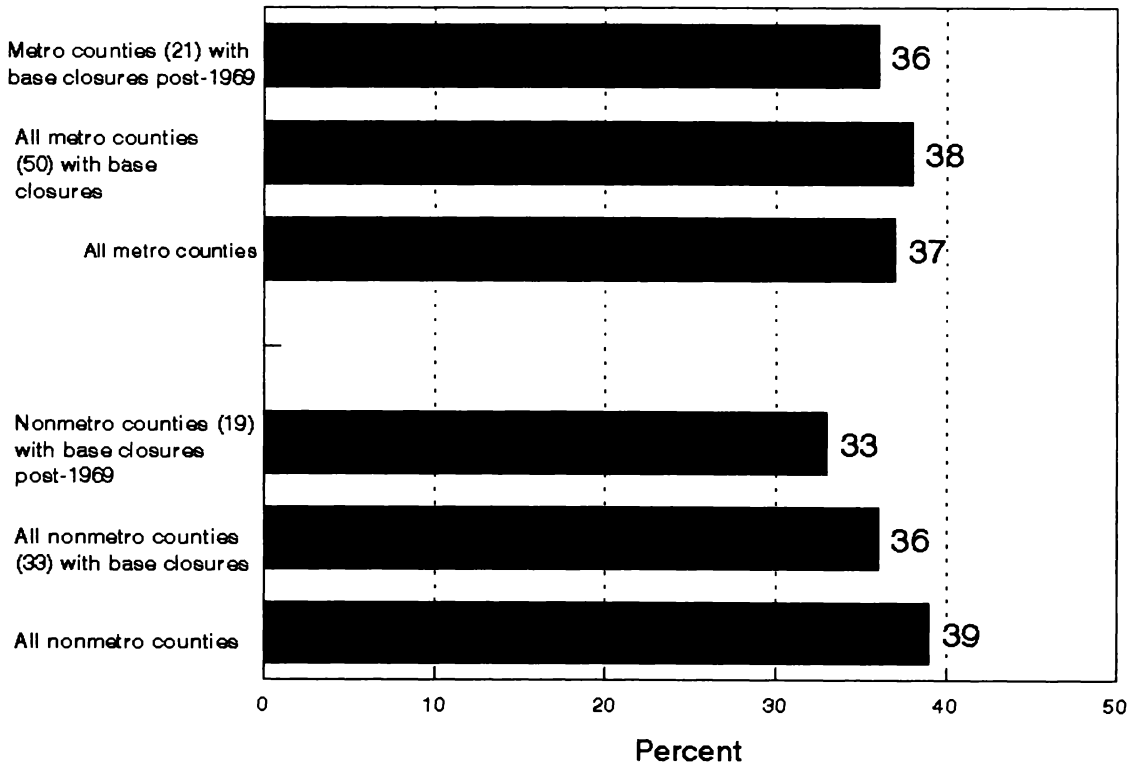


Figure 5

Change in real income, county average, 1969-88

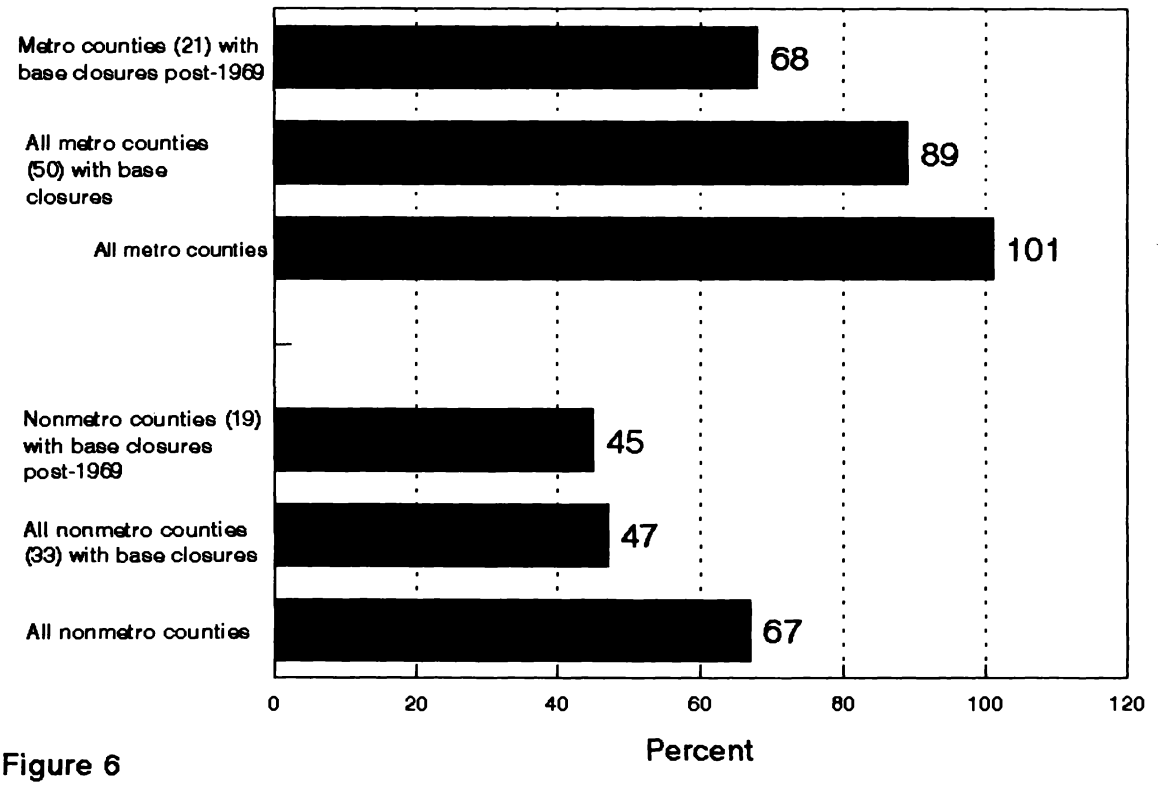
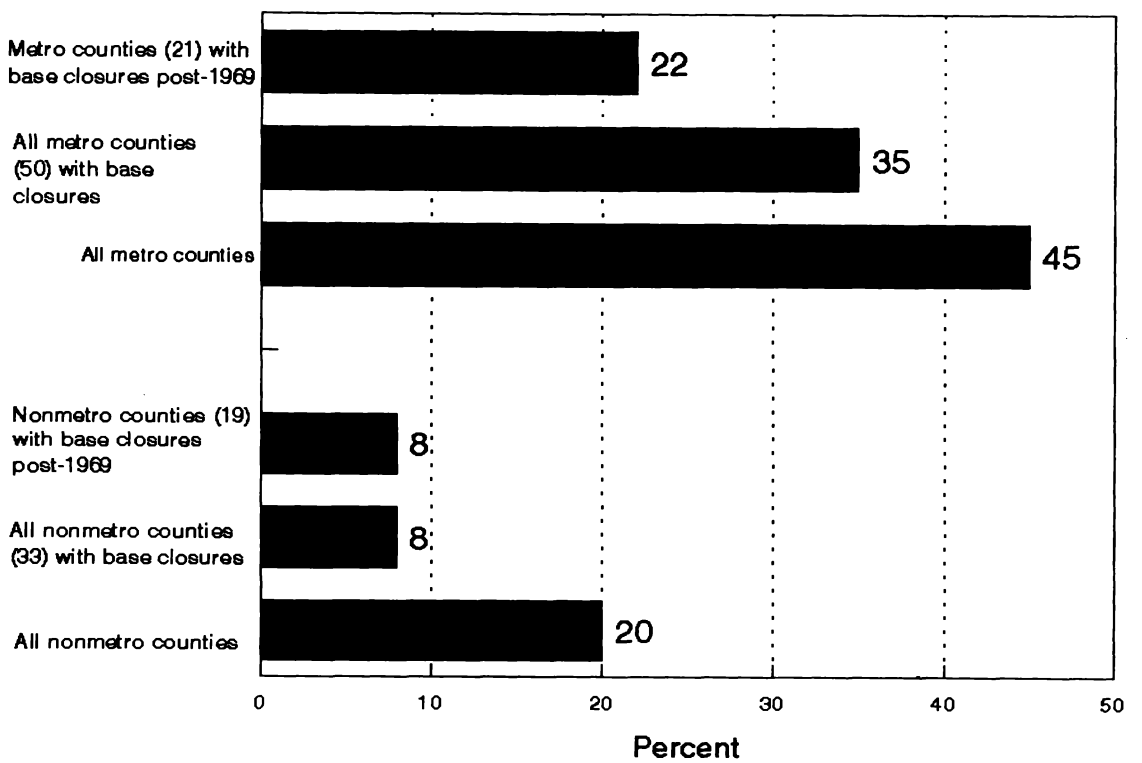


Figure 6

Change in population, county average, 1969-88



faster than in nonmetro counties, and population in counties (both metro and nonmetro) with base closures grew significantly slower on average than in all counties nationwide. Military base closures adversely affected population growth in their communities.

Conclusions

As with the loss of any major employer, the closure of a military base can harm its host community. That harm, it is hypothesized, may be greater in rural communities given their typically smaller and less-diversified economic base. The assets of a closed military base—land, buildings, and physical equipment—are often provided to the local community at little or no cost. Such assets, wisely and strategically used, can often lead to redevelopment of the local economy, making it stronger than before the base closed.

The success of military base conversion depends upon such factors as the attributes of the particular facilities involved, the amount and quality of planning for conversion, the characteristics and health of the local economy—as well as the regional and national economic climate, and the extent of the local economy's dependence upon the base. Variations in the success of conversion between metro and nonmetro counties may be explained by differences between metro and nonmetro base-closing counties across these just-listed variables.

Comparisons between metro and nonmetro counties where bases closed, and between these base-closing counties and their respective (metro and nonmetro) national means reveal the following conclusions.

First, nonmetro base-closing counties lost more than twice as large a proportion of total county employment through civilian onbase job cuts as did metro base-closing counties (3.25 percent versus 1.32 percent). In terms of military transfers, nonmetro counties also lost more than double the percentage of county employment experienced by their metro counterparts. Combining the two types of job losses (while noting that the two types of losses have different multiplier effects), the average nonmetro base-closing county lost nearly 10 percent of its total county employment, compared with only 4 percent for the average metro county. So, regardless of the measure used, nonmetro counties are more severely affected by base closings than are the metro counties.

Second, two-thirds of base-closing counties (70 percent nonmetro and 68 percent metro) regained as many civilian jobs as were lost. The picture for nonmetro counties worsens dramatically if transfers are included.

Third, employment growth in nonmetro base-closing counties was only 78 percent of the national nonmetro average. In contrast, metro base-closing counties grew at 90 percent of the national metro average rate.

Fourth, real income growth was relatively and absolutely weaker in nonmetro base-closing counties than in metro base-closing counties. Per capita income growth in nonmetro base-closing counties averaged only 92 percent of the national nonmetro average rate, while metro base-closing counties grew at roughly the all-metro rate. Nonmetro base-closing counties did even worse in total income, averaging only 70 percent of the nonmetro national average. The difference between per capita and total income figures is explained by population growth, which was also slower in nonmetro base-closing counties.

Thus, on all measures analyzed, the average nonmetro base-closing county fared worse than its metro counterpart. The experience of individual base-closing counties (metro and nonmetro) varied widely, depending on a number of factors mentioned above.

These findings are consistent with conclusions from earlier studies. On average, family income is not significantly affected by base closure although a region's total income and employment may decline. More emphasis should be placed on the fact that not all nonmetro communities do equally well in recovering from a closure. Some did much better without the base; however, many did not.

A rough correspondence exists between the length of time for conversion and the success of redevelopment of the base site. The cause and effect, however, are not clear. The correspondence conforms with Lynch's observation that communities that spent more time and resources fighting closure than in planning for closure tended to have more difficulties recovering from closure.

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Appendix table 1—Individual base data of military base closures by metro and nonmetro county

Base name	State	County	Year of— Closure	Year of— Acquisition	Civilian jobs lost on base	Military transfers	Civilian jobs added on former base	Jobs regained as a percentage of— Civilian jobs lost	Jobs regained as a percentage of— Civilian jobs lost and military transfers
					Number			*Percent*	
Nonmetro:									
Wildwood AFS	AK	Kenai Peninsula	1972	1974	63	380	116	184	26
Thomasville AFS	AL	Clarke	1970	1971	18	110	200	1,111	156
Craig AFB	AL	Dallas	1977	1978	547	1,863	390	71	16
Truman Annex	FL	Monroe	1973	1986	568	3,356	60	11	2
Glynco NAS	GA	Glynn	1974	1976	344	1,828	2,500	727	115
Bakalar AFB	IN	Bartholomew	1970	1972	318	61	491	154	130
Schilling AFB	KS	Saline	1965	1966	326	4,710	4,200	1,288	83
Houma AFS	LA	Terrebonne	1972	1972	18	112	1,000	5,556	769
New Iberia NAS	LA	Iberia	1965	1966	85	1,025	1,220	1,435	110
Charleston AFS	ME	Penobscot	1979	1981	23	169	97	422	51
Presque Isle AFB	ME	Aroostook	1961	1962	268	1,259	1,250	466	82
Dow AFB	ME	Penobscot	1968	1968	342	5,479	2,500	731	43
Kincheloe AFB	MI	Chippewa	1977	1978	737	3,074	2,144	291	56
Wadena AFS	MN	Wadena	1971	1973	15	130	30	200	21
Baudette AFS	MN	Lake of the Woods	1979	1981	30	100	25	83	19
Camp Crowder, AFP 65	MO	Newton	1970	1968-75	1,200	0	3,500	292	292
ABM Site	MT	Pondera	1972	1975	153	20	50	33	29
Glasgow AFB	MT	Valley	1968	1979	309	3,500	24	8	1
Lewistown AFS	MT	Fergus	1971	1974	27	163	3	11	2
Hastings Nav. Am. Depot	NE	Adams	1966	1966	240	10	1,650	688	660
Sioux Army Depot	NE	Cheyenne	1967	1967	585	2	650	111	111
Walker AFB	NM	Chaves	1967	1967	379	4,900	3,000	792	57
Stewart AFB	NY	Orange	1969	1971	1,011	2,700	1,000	99	27
Watertown AFS	NY	Jefferson	1979	1981	24	114	498	2,075	361
Clinton Co. AFB	OH	Clinton	1971	1973	613	66	4,000	653	589
Bellefontaine AFS	OH	Logan	1969	1970	27	136	120	444	74
Clinton-Sherman AFB	OK	Washita	1969-70	1970	381	1,700	400	105	19
Adair AFS	OR	Benton	1969	1973	180	864	105	58	10
Newport Naval Base	RI	Newport	1974	1978	484	11,069	2,500	517	22
Black Hills Army Depot	SD	Fall River	1967	1968	512	12	4	1	1
Fort Wolters	TX	Palo Pinto	1974	1975-77	1,219	692	1,638	134	86
Sweetwater AFB	TX	Nolan	1971	1971	25	100	130	520	104
Webb AFB	TX	Howard	1977	1978	909	2,204	575	63	18
Larsen AFB	WA	Grant	1966	1966	38	3,947	900	2,368	23
Nonmetro total	na	na	na	na	12,018	55,855	36,970	na	na
Metro:									
Brookley AFB	AL	Mobile	1965-69	1969	12,300	1,070	3,000	24	22
Dauphin Island AFS	AL	Mobile	1971	1972	26	112	45	184	33
Theodore Army Terminal	AL	Mobile	1965	1965	14	0	1,550	11,071	11,071
Torrance Annex, NSC	CA	Los Angeles	1973	1974	50	0	6	12	12
Benicia Arsenal	CA	Contra Costa	1964	1965	2,321	32	5,700	246	242
Nike Site 78	CA	Los Angeles	1974	1974	0	142	40	na	28
Nike Site 55	CA	Los Angeles	1974	1974	0	91	60	na	66
Oxnard AFB	CA	Ventura	1970	1976	293	1,215	1,300	444	86
Fort MacArthur	CA	Los Angeles	1974	1975	1,306	750	685	52	33
Nike Site 04	CA	Los Angeles	1974	1976	0	142	100	na	70
Ent AFB	CO	El Paso	1971	1976-80	0	0	280	na	na
Atlantic Fleet Site	FL	Clay	1962	1964	324	1,281	650	201	40
McCoy AFB	FL	Orange	1974	1975	395	2,812	6,000	1,519	187
Sanford NAS	FL	Seminole	1968	1969	230	646	1,400	609	160
Albany NAS	GA	Dougherty	1974	1978	341	3,217	2,000	587	56
Forest Park Nav. Ord.	IL	Cook	1971	1973	1,600	6	2,400	150	149
Decatur Army Sig. Depot	IL	Macon	1962	1963	1,310	27	1,944	148	145

Continued—

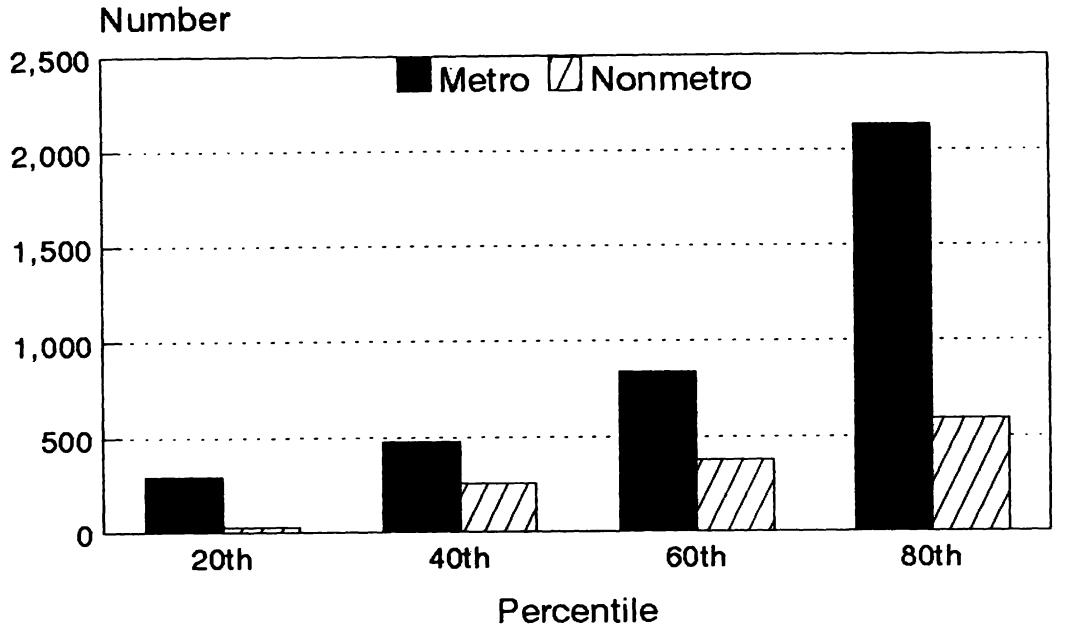
Appendix table 1—Individual base data of military base closures by metro and nonmetro county

Base name	State	County	Year of—		Civilian jobs lost on base	Military transfers	Civilian jobs added on former base	Jobs regained as a percentage of—	
			Closure	Acquisition				Civilian jobs lost	Civilian jobs lost and military transfers
					Number			*Percent*	
Metro—Continued									
Def. Ind. Pl. Eq. Center	IN	Vigo	1966	1967	253	0	1,100	435	435
Forbes AFB	KS	Shawnee	1973	1976	416	3,739	1,600	385	39
Chennault AFB	LA	Calcasieu	1963	1964	252	3,030	4,000	1,587	122
Chelsea Naval Hospital	MA	Suffolk	1974	1979	326	462	130	40	16
Watertown Arsenal	MA	Middlesex	1967	1968	2,306	17	1,360	59	59
Springfield Arsenal	MA	Hampden	1968	1968	2,400	20	3,250	135	134
Westover AFB (1)	MA	Hampden	1974	1977	(150)	4,014	2,900	na	75
Boston Shipyard	MA	Suffolk	1974	1979	5,552	553	3,700	67	61
Boston Army Base (2)	MA	Suffolk	1974-81	1977-83	0	0	3,600	na	na
Fort Holabird	MD	Baltimore	1973	1977	2,805	1,335	1,800	64	43
Duluth AFB	MN	St. Louis	1982	1984	446	1,040	200	45	13
Richards-GeBaur AFB	MO	Clay	1977	1985	1,500	2,400	475	32	12
Greenville AFB	MS	Washington	1965	1966	242	2,048	325	134	14
AF Interceptor Squad.	NC	New Hanover	1967	1976	4	96	487	12,175	487
Lincoln AFB	NE	Lancaster	1966	1966	396	6,383	3,000	758	44
Fort Omaha	NE	Douglas	1975	1976	49	56	228	465	217
Grenier AFB	NH	Hillsborough	1966	1966-75	138	320	3,200	2,319	699
Raritan Arsenal	NJ	Middlesex	1964	1964-5	2,610	8	13,100	502	500
Burlington AAP	NJ	Burlington	1973	1977	520	10	500	96	94
Camp Kilmer	NJ	Middlesex	1963	1965	578	426	3,800	657	378
Nike Site 25	NJ	Burlington	1974	1976	94	0	75	80	80
Stead AFB	NV	Washoe	1966	1969	519	2,133	2,000	385	75
Voorheesville Depot	NY	Albany	1966	1967	1,000	20	300	30	29
St. Albans Naval Hosp.	NY	Queens	1974	1974	386	517	865	224	96
Army Pictorial Center	NY	Queens	1970	1972	388	64	1,070	276	237
Brooklyn Army Terminal	NY	Kings	1976	1981	336	54	6,700	1,994	1,718
Schenectady Depot	NY	Schenectady	1966	1967	484	15	600	124	120
Erie Ordinance Depot	OH	Ottawa	1966	1967	1,885	35	1,200	64	63
Rossford Arsenal	OH	Lucas	1966	1967	1,885	35	3,900	207	203
Rickenbacker AFS	OH	Franklin	1978	1984	380	1,700	625	164	30
Olmsted & Middletown	PA	Dauphin	1965-68	1969	10,050	1,250	2,800	28	25
Marietta AFD	PA	Lancaster	1967	1968	750	0	636	85	85
Frankford Arsenal	PA	Philadelphia	1977	1983	3,400	17	2,000	59	59
Valley Forge Hospital	PA	Chester	1973-74	1978	845	546	50	6	4
York Ordnance Plant	PA	York	1964	1964	1,092	13	1,600	147	145
Quonset Point NAS	RI	Washington	1974	1978-80	4,500	6,211	7,500	167	70
Donaldson AFB	SC	Greenville	1963	1964	672	4,100	5,253	782	110
Sewart AFB	TN	Rutherford	1969	1971	470	4,050	1,539	327	34
Harlingen AFB	TX	Cameron	1962	1963-64	720	3,100	1,600	222	42
Amarillo AFB	TX	Potter	1968	1969	1,511	5,560	600	40	8
Camp Gary	TX	Hays	1963	1965	30	1	750	2,500	2,419
James Connally AFB	TX	McLennan	1966	1966	833	2,980	2,000	240	52
Perrin AFB	TX	Grayson	1971	1972	600	1,930	437	73	17
Laredo AFB	TX	Webb	1973	1975	700	1,998	2,200	314	82
Truax Field	WI	Dane	1968	1968	378	2,658	3,000	794	99
Metro total	na	na	na	na	75,061	76,487	125,215	na	na
Metro & nonmetro total	na	na	na	na	87,079	132,342	162,185	na	na

na = Not applicable.
(1) Conversion to Air Force reserve operations resulted in net addition of civilian jobs in military operations.
(2) Jobs lost and transfers are included with Boston Shipyard.

Appendix figure 1

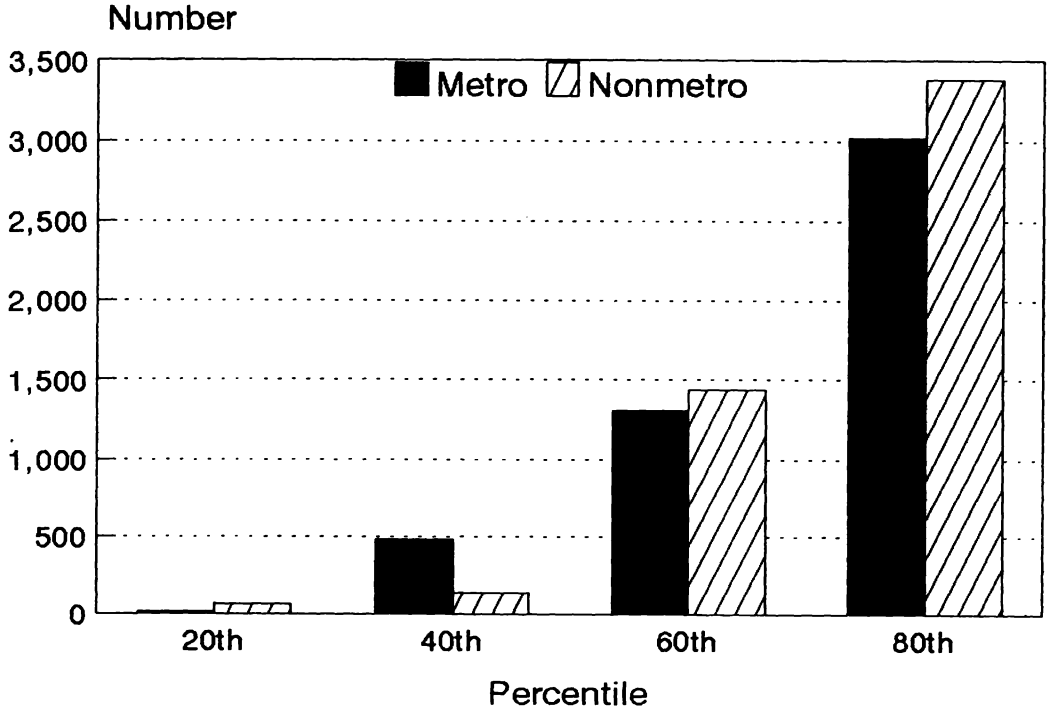
Percentile values for the number of civilian onbase jobs lost*



*Percentile values represent the break points for each quintile in our data set. Thus, the value shown above for the 80th percentile represents the value below which 80% of our observations fell.

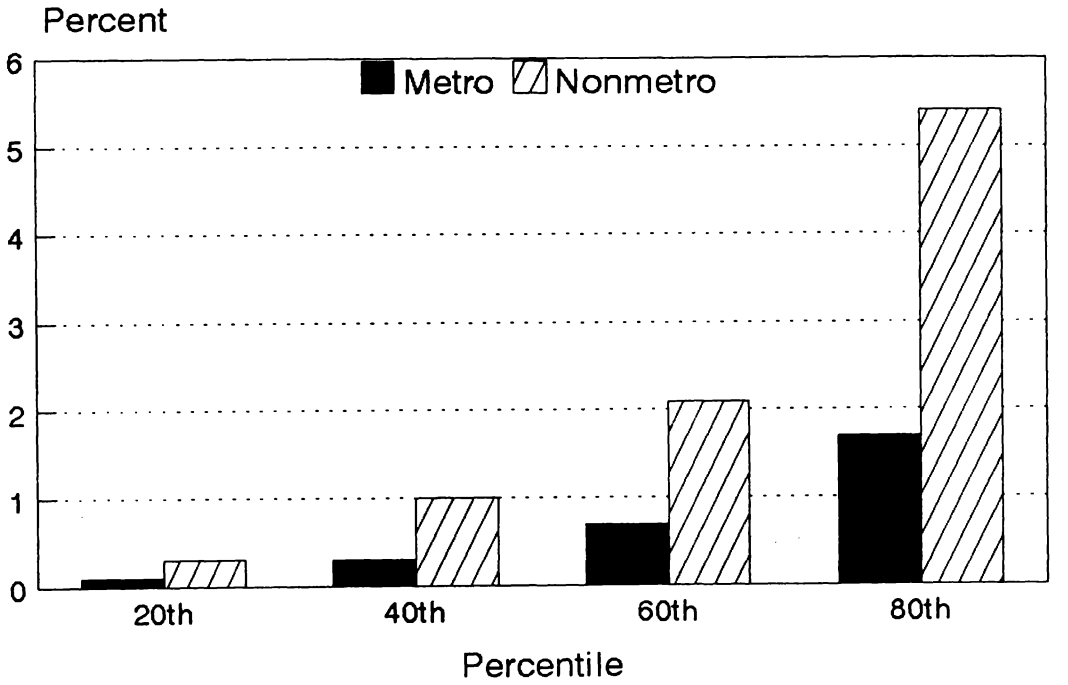
Appendix figure 2

Percentile values for number of military personnel transfers



Appendix figure 3

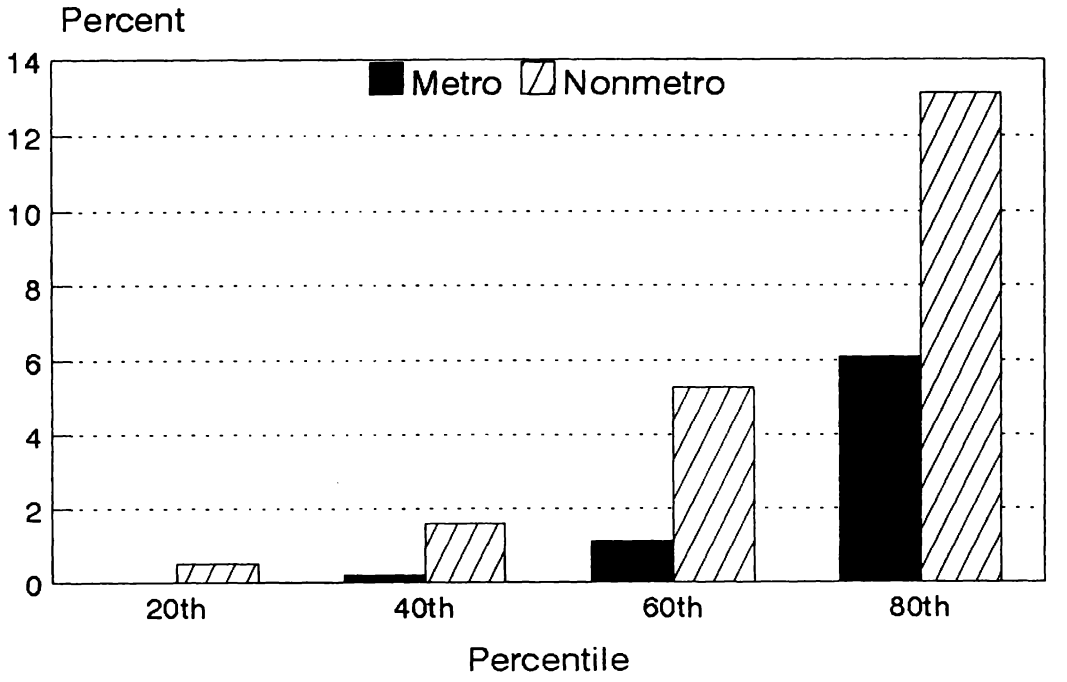
Percentile values for jobs lost as a percentage of total county employment*



*Data are for year of military base closure.

Appendix figure 4

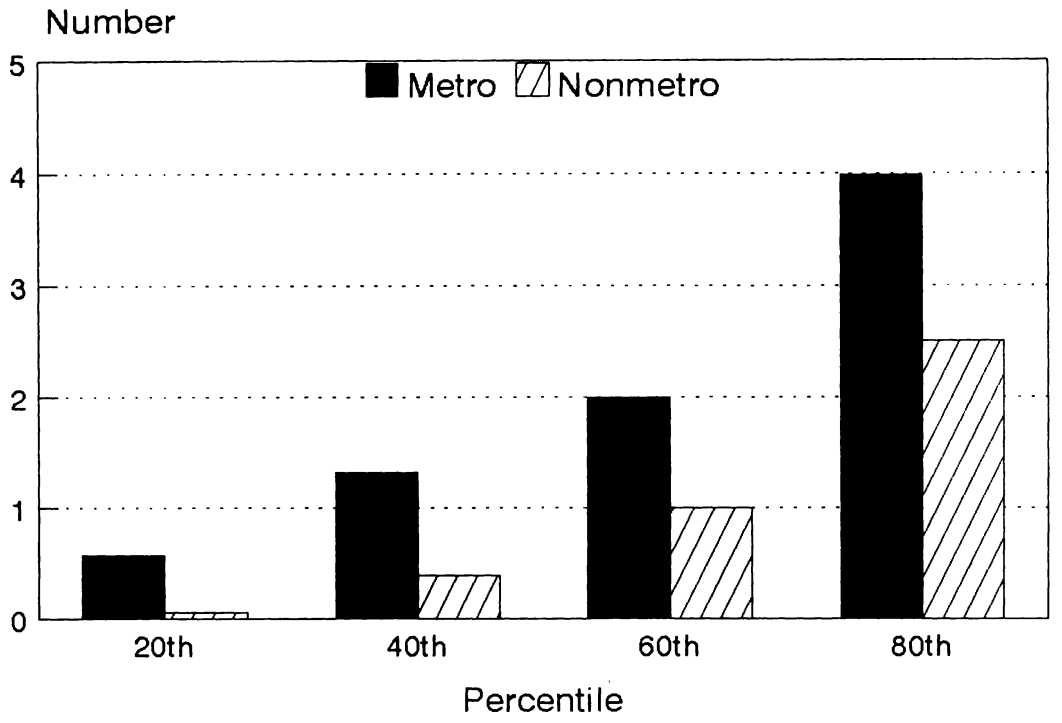
Percentile values for military personnel transfers as a percentage of total county employment*



*Data are for year of base closure.

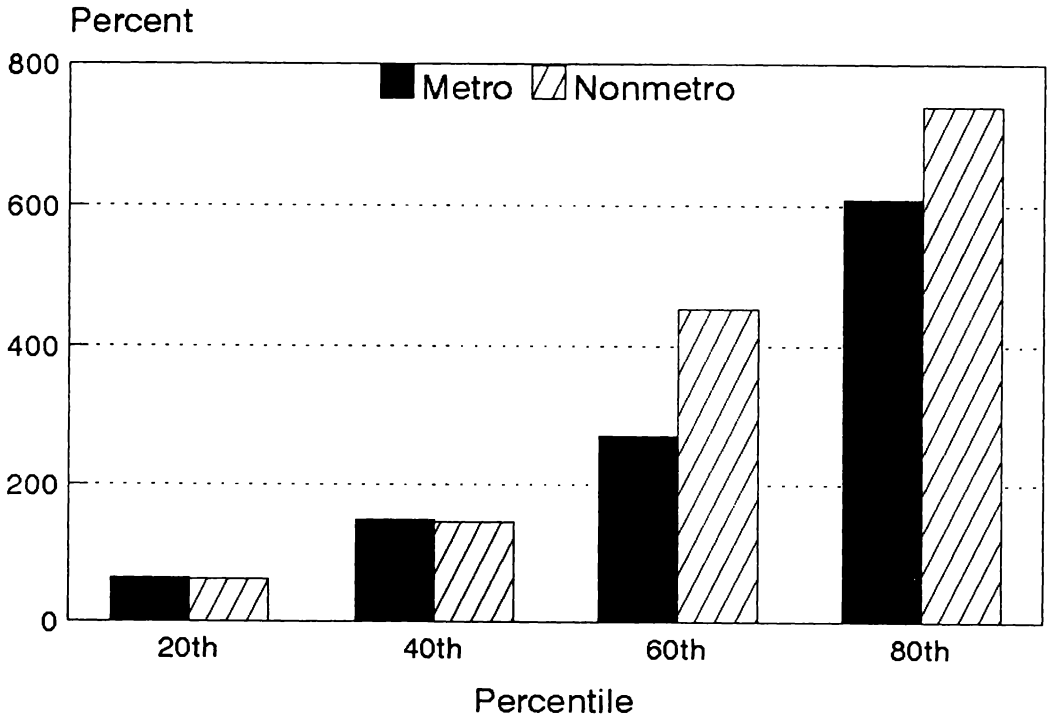
Appendix figure 5

Percentile values for the number of new jobs on the former military base



Appendix figure 6

Percentile values for new jobs on the former military base as a percentage of civilian jobs lost



Appendix figure 7

Percentile values for new jobs on the former military base as a percentage of lost civiilian jobs and military personnel transfers